

tion was explained by Mr. J. W. Arrowsmith. Eight or nine years ago, about 400*l.* was collected yearly to forward higher education in Bristol, and the amount is now nearly 600*l.* per annum. In all, the society had collected a sum of 4732*l.* Speaking as to the University itself, Mr. Arrowsmith said the promise of Mr. H. O. Wills, announced in *NATURE* last week, was satisfactory to all, and all welcomed it very heartily and with deep gratitude to Mr. Wills. But the 100,000*l.* gift is not everything. The amount aimed at before the Privy Council is asked for the charter is 250,000*l.* The aggregate sum of 30,000*l.* was promised at the dinner a year ago. The sums were:—Lord Winterstoke, 10,000*l.*; Mr. J. S. Fry, 10,000*l.*; Mr. Frederick Wills, 5000*l.*; and Mr. F. J. Fry, 5000*l.* Adding for buildings and endowments in connection with University College the sum of 55,000*l.*, a total of 85,000*l.* is reached. Add to that the 100,000*l.*, and 185,000*l.* is obtained. Mr. Arrowsmith said that a friend, since he had been in the building, had added another 10,000*l.*, giving a total in hand or promised of 195,000*l.* It is obvious, therefore, that a sum of 55,000*l.* must be secured before the charter can be sought. Four sums each of 1000*l.* from Mr. Charles Thomas, Mr. Edward Robinson, Mr. Hiatt Baker, and an anonymous benefactor have also been offered. It should not be long, therefore, before the quarter of a million required for the university is raised by the men of wealth in Bristol who realise the value of higher education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 12, 1907.—"The Effects of Temperature and Pressure on the Thermal Conductivities of Solids. Part ii. The Effect of Low Temperatures on the Thermal Conductivities of Pure Metals and Alloys." By Prof. C. H. Lees, F.R.S.

The object of the work described in the present paper was to extend the measurements of thermal conductivities of metals and alloys made by Lorenz, Jäger, and Diesselhorst and others at temperatures between 0° C. and 100° C. down to the temperature of liquid air, and thus provide a means of comparing the thermal and electrical conductivities of these substances over a much wider range of temperature than has hitherto been possible. The method adopted was a modification of that used originally by Wiedemann and Franz.

The results obtained are tabulated, together with those given for higher temperatures by Jäger and Diesselhorst, and they justify the following statements:—

(1) The thermal conductivities of most pure metals decrease as the temperature rises within the range -160° C. to 100° C.

(2) The thermal conductivities of all alloys tested increase as the temperature rises within the range -160° C. to 100° C.

Institution of Mining and Metallurgy, January 16.—Prof. William Gowland, president, in the chair.—The Vaal River diamond diggings: Mungo Park. A brief description of the diamondiferous terrace deposits flanking the course of the Vaal River. The author stated that the diamonds obtained from the river gravels are, taken collectively, probably the finest stones obtainable, averaging about 6*l.* per carat as sold to buyers on the diggings. Methods of working these deposits, and a few notes on the general conditions of digging, are dealt with in this short paper.—The eruptive diamond-bearing breccias of the Boshof district, South Africa: J. P. Johnson. A paper describing the three occurrences of diamond-bearing rock in the district, principally from a geological point of view. Special attention is directed to the lherzolite and eclogite boulders, which contain in proportionate abundance all the characteristic minerals of the eruptive diamond-bearing breccia, and which the author thinks are the more resistant portions of a rock which has gone to form the bulk of the breccia, and was the real home of the diamond. This lherzolite-eclogite rock may exist either as a widespread consolidated formation occurring at great depths or as a deep-seated molten magma, the former condition being more likely. The author can see nothing

in the breccia other than a purely fragmentary formation, nor has he been able to detect traces of contact metamorphism either of the walls of the vent or of the included boulders. He concludes, therefore, that the type of volcanic phenomenon producing the peculiar features of these diamond-bearing vents would be a geyser rather than a volcano, more especially as there is not the least evidence of any molten rock or lava having passed through them.—The auriferous banded ironstones and associated schists of South Africa: Owen Letcher. Five principal mines working in the banded ironstone beds and associated schists are passed under review in turn under the following heads:—salient geological features; occurrence of gold in the formation; methods of mining and productive and economic values; and metallurgy of the series. The author points out that these banded ironstones are the oldest known auriferous sedimentary rocks in South Africa, lying between the basement schists and the conglomerate series, and he considers that on account of what is at present known as to the great width of the gold-bearing formation, the occurrence of gold in many places in payable quantities, and the amenability of the ores to a simple method of treatment, the exploitation of mines in the series is likely to assume considerable importance in future South African history.

PARIS.

Academy of Sciences, January 15.—M. Henri Becquerel in the chair.—Note on the density of graphite: H. Le Chatelier and S. Wologdine. On account of the wide range of densities which various experimenters have given for graphite, it has been assumed that graphite is not a single variety of carbon, although this is contradicted by the constancy of the heat of combustion of purified graphite. The authors have examined the following:—Acheson graphite (artificial); graphite from Ceylon, Australia, Bohemia (Mugrau and Scharzbach), Greenland, commercial graphite, and from cast iron. The method employed was flotation in a heavy liquid (mixtures of acetylene bromide and ether), care being taken to eliminate all air bubbles. The figures for the unpurified material from these sources varied between 1.62 and 2.66. Purification by Moissan's method was then tried, but the results were no more concordant, the deviations being finally traced to the imperfect removal of air. This was surmounted by removing the air by a vacuum, strongly compressing, breaking up again, placing a second time in a vacuum, and re-compressing. Under these experimental conditions all the natural and artificial graphites after complete purification gave the same density of 2.255 at 15° C. compared with water at 4° C.—The utilisation of turf for the purification of sewage: A. Muntz and E. Laine. The experiments detailed show that natural turf is a highly satisfactory medium for forming sewage filter beds. The experimental filter has been at work for more than seven months, and its activity is still unimpaired. It is capable of treating a volume of from three to four cubic metres of sewage per square metre of surface per day. Figures are given of the chemical and bacterial purification effected, and fish live without inconvenience in the effluent. If loaded above this, the effluent is fair, but not so good, and it has been noted that on reducing the load to the normal figure the filter immediately recovers to original efficiency.—Observation of the transit of Mercury at the Observatory of Rio de Janeiro: M. Morizo. The atmospheric conditions were unfavourable to good observations.—Observation of the transit of Mercury of November 13-14, 1907, at Schol, Italy: Fr. Faccin. The atmospheric conditions were bad.—The summability of Fourier's series: A. Buhl.—The choice of the exponent of convergence for integral functions of infinite order: A. Denjoy.—The measurements of general movements of the soil by means of levellings repeated at long intervals: Ch. Lallemand. An analysis of the degree of exactitude practically possible in levelling operations shows that it is only in exceptional cases that a repetition of the measurements will permit the demonstration with certainty of gradual general movements under 1 decimetre.—The statics of a deformable surface and the dynamics of a deformable line: Eugène and François Cosserat.—The transformations of solutions of white phosphorus into red phosphorus: Albert Colson. Experi-

ments with solutions of phosphorus in carbon bisulphide and in turpentine at various temperatures between 230° C. and 290° C. showed that the presence of the solvent causes the rate of transformation of the white into the yellow modification to be reduced.—The constitution of cast irons containing manganese: L. **Guillet**. Manganese displaces the eutectic point, which is produced for lower percentages of carbon than with the iron-carbon alloys. Other changes caused by the gradual increase of the percentage of manganese are noted.—Ammoniacal cuprous sulphate: M. **Bouzat**. The salt is formed by the interaction of aqueous ammonia, cuprous oxide and ammonium sulphate, and precipitated by alcohol. It is filtered off on asbestos, and washed with alcohol and ether. Great care has to be taken to exclude all traces of air, all reagents being freshly boiled, and the whole series of operations carried out in a current of pure hydrogen. Analyses of the precipitated salt show it to possess the composition $\text{Cu}_2\text{SO}_4 \cdot 4\text{NH}_3$. The reactions are those of a cuprous salt, oxidising instantly when exposed moist to the air, and giving copper, cupric sulphate, and ammonium sulphate when treated with dilute sulphuric acid.—Syntheses in the camphor group. The complete synthesis of β -campholene lactone: G. **Blanc**. The starting point of this synthesis is $\alpha\alpha$ -dimethyladipic acid, and this is converted successively into its sodium derivative, dimethyl-cyclopentanone-acetic acid, and the ethyl ester of the latter. The bitertiary glycol obtained from this by Grignard's reaction forms a lactone identical with β -campholene lactone.—The constitution of the α - and β -methylsparteines and of isosparteine: Charles **Moureu** and Amand **Valeur**.—The synthesis of racemic dihydrocamphoric acid: L. **Bouveault** and R. **Locquin**.—The innervation of the sterno-mastoid and cleido-mastoid muscles: F. X. **Lesbre** and F. **Maignon**.—The action of fresh kola nut on work: J. **Chevalier** and M. **Alquier**.—The apparent double refraction of vibratory cilia: Fred **Vies**.—The action of choline on the arterial pressure: A. **Desgrez** and J. **Chevalier**. Choline furnishes the first example of a physiological substance of well-defined chemical composition, producing a marked lowering of the arterial pressure. It behaves as an antagonist to adrenaline, and it is possible to associate these two substances in such quantities that the one neutralises the effect of the other on the blood pressure.—Hexamer sea-urchins: Edouard **de Ribaucourt**.—*La graisse* in wine: E. **Kayser** and E. **Manceau**. The change in wine known technically as *la graisse* is complex, and is not caused by a single organism, but by the combined growth of several organisms.—The diminution of the salinity of sea water after filtering through sand: J. **Thoulet**. It is popularly supposed that the salinity of sea water is considerably reduced by filtration through sand. Direct experiments of the author have failed to confirm this.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 23.

ROYAL SOCIETY, at 4.30.—Report on the Eruptions of the Soufrière in St. Vincent in 1902, and on a Visit to Montagne Pelée in Martinique. Part II.: The Changes in the Districts and the Subsequent History of the Volcanoes: Dr. Tempest Anderson.—Petrographical Notes on the Products of the Eruptions of May, 1902, at the Soufrière in St. Vincent: Dr. J. S. Fleet.—On the Intimate Structure of Crystals. Part VI., Titanic Oxide, its Polymorphs and Isomorphs: Prof. W. J. Sollas, F.R.S.—Dietetics in Tuberculosis; Principles and Economics: Dr. N. D. Bardwell and J. E. Chapman.—The Origin and Destiny of Cholesterol in the Animal Organism. Part I.: On the so-called Hippocoprosterol: C. Dorée and J. A. Gardner.

ROYAL INSTITUTION, at 3.—Recent Light on Ancient Physiographies: Prof. W. W. Watts, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Standard Performances of Electrical Machinery: R. Goldschmidt.

FRIDAY, JANUARY 24.

ROYAL INSTITUTION, at 9.—The Extinction of Malta Fever: Col. David Bruce, C.B., F.R.S.

PHYSICAL SOCIETY, at 5.—Recalcence Curves: W. Rosehain.—An Experimental Examination of Gibbs' Theory of Surface Concentration Regarded as the Basis of Adsorption, and an Application to the Theory of Dyeing: W. C. M. Lewis.

INSTITUTION OF CIVIL ENGINEERS, at 8.—A Cost Theory of Reinforced-Concrete Beams: J. R. Wade.—The Neutral Axis in Reinforced-Concrete Beams: E. I. Spiers.

SATURDAY, JANUARY 25.

ROYAL INSTITUTION, at 3.—The Electrification of Railways: Prof. Gisbert Kapp.

MATHEMATICAL ASSOCIATION, at 2.30.—Address by the President, Prof. G. H. Bryan, F.R.S.—On the Teaching of Elementary Mechanics, with Special Reference to the Preparation and Use of Simple and Inexpensive

Apparatus: W. J. Dobbs.—On the Teaching of the Elements of Analysis: C. O. Tuckey.—On the Geometrical Treatment of Series in Trigonometry, with Lantern Illustrations: F. J. W. Whipple.—On a New Treatment of Similarity in Elementary Geometry: W. E. Bryan.—Machine for Drawing Rectangular Hyperbolas: H. L. Trachtenberg.

ESSEX FIELD CLUB (at the Essex Museum, Romford Road, Stratford), at 6.—Report of Club's Delegate at British Association, Leicester, 1907: F. W. Rudler.—On Plant Distribution in the Neighbourhood of Felstead, Essex: J. French.

MONDAY, JANUARY 27.

SOCIETY OF ARTS, at 8.—The Theory and Practice of Clock Making: H. H. Cunynghame, C.B.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Exploration and Climbing in the Gurlwal Himalayas: Dr. T. G. Longstaff.

INSTITUTE OF ACTUARIES, at 5.—On the Construction of Mortality Tables from Census Returns and Records of Deaths: G. King.

TUESDAY, JANUARY 28.

ROYAL INSTITUTION, at 3.—Roman Britain: (a) Its Frontiers and Garrison: Prof. F. J. Haverfield.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.30.—Annual General Meeting.—President's Address: Anthropology in the Eighteenth Century: Prof. D. J. Cunningham, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Continued discussion: Experimental Investigations of the Stresses in Masonry Dams subjected to Water Pressure: Sir J. W. Oatley, K.C.I.E., and Dr. A. W. Brightmore.—Stresses in Dams; an Experimental Investigation by Means of India-rubber Models: J. S. Wilson and W. Gore.—Stresses in Masonry Dams: E. P. Hill.

WEDNESDAY, JANUARY 29.

SOCIETY OF DYERS AND COLOURISTS, at 8. Colloidal Dyestuffs: Dr. E. Feilmann.—Notes on the Dyeing of Celluloid: Dr. J. N. Goldsmith.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.

THURSDAY, JANUARY 30.

ROYAL SOCIETY, at 4.30.—Probable Papers: On the Observation of Sun and Stars made in some British Stone Circles. Third Note: The Aberdeenshire Circles: Sir Norman Lockyer, K.C.B., F.R.S.—On the Non-periodic or Residual Motion of Water moving in Stationary Waves: Mrs. W. E. Ayrton.—The Refractive Index and the Dispersion of Light in Argon and Helium: W. Burton.—On the Generation of a Luminous Glow in an Exhausted Receiver moving near an Electrostatic Field, and the Action of a Magnetic Field on the Glow so produced: Rev. F. J. Jervis-Smith, F.R.S.

FRIDAY, JANUARY 31.

ROYAL INSTITUTION, at 9.—Recent Researches on Radio-activity: Prof. E. Rutherford, F.R.S.

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